LONG TERM PLANNING FOR HIGHWAY SAFETY: TURKISH EXAMPLE

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Abstract: In this study, the notion of traffic safety is taken into consideration. The effect of planning on traffic safety is expressed, based on certain studies made in different countries. Then, the state of traffic safety in Turkey is explained. Finally, the subject is opened to discussion after information is given on the planning studies for traffic safety, which began only lately in this country. The extent of these late studies in Turkey is presented in detail.
Turkish state, financed by its own resources and the World Bank credits, is conducting a highway improvement and traffic safety project. Within this main project, a traffic safety project is realised as one of the main topics; and it has a budget of 91 million USD. It comprises three parts. They are the Pilot Project, the National Project and the National Highway Traffic Safety System Strategy.
The general aim of the traffic safety plan is to decrease the number of casulties and injuries by over 40 percent within 10 years.

Key words: Traffic Accidents, Highway safety, Planning

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1 Highway Security

The main criterion in highway safety is the rate of traffic accidents. Theoretically, if there are no accidents, security is complete. If the contrary is considered, with each accident occurring, security will be lowered.

Traffic accidents are evaluated with statistical data under certain measures belonging to human, vehicle and road characteristics. Thus, states and points of hazard can be determined. Each idea, technique or method helping to decrease the number of accidents or lower their effects is also a means of security measure.

In general accidents are negative effects, which causes losses for humans, operators and society; and some of these losses are talefi edilemez. It is possible to define highway traffic accidents in different ways. However, in all of the accepted definitions, the basic elements of transportation, human, vehicle and road characteristics, and their interactions are emphasised. According to this, a traffic accident in general, is an incident, which happens because of an interaction between these basic elements and sometimes environmental conditions and results in physical damage, injuries and/or fatalities.

Individuals involved in highway transportation are outside a total control system because of their actions based on their free purposes and behaviours. In rail, air and marine transport individuals are directed to certain limited actions according to pre-planned central control systems. Vehicles in these transportation systems are put onto certain routes in space and time by professionals. A wide range of information continuously monitors them and necessary interventions are made. Thus, the probability of accidents is minimised. In case of accidents, it is possible to take and put into effect concrete measures after necessary examinations are made. [2]

In highway transport on the other hand, different characteristics are in question. Each vehicle is under the specific intuition of its driver. The high number of vehicles and the fast increase in this number compared with the other modes is continuously narrowing the amount of road space per unit. On the other hand, control the monitoring possibility of the driver is relatively weak. This situation is the main reason of the difference of highway transport from the other transport modes.

2 Highway Security Planning

In the discussions on highway safety, generally it is accepted that traffic accidents are one of the most important problems in most countries, that it is necessary to pay specific attention to the issue, that traffic safety is a part of education, and that it is necessary to get rid of black points. However, these discourses are far from answering questions like what is the priority of traffic accidents in the country's agenda, which parameters show the importance given on traffic accidents, are there any changes in these parameters, are there any specific aims in lowering the number of injuries and fatalities. It is actually difficult to answer these questions. Since no aims are defined, resources cannot be distributed accordingly, and thus evaluations about the effectiveness of the studies on the subject cannot be made.

In order to use the resources more effectively, it is necessary to make a work plan with a specific aim. Actions involved in such a plan will be consecutive and interactive. This sequence starts with resources and aims and continues with applications. It includes performance aims. Then, it goes on with common situation aims in which institutional activities are evaluated. The sequence ends with general aims.

In this traffic safety study, aims determined for traffic accidents, fatalities and injuries are evaluated within "general aims". In order to clarify the differences between the aims and demands, general aims should be related with the common activity aims. To reach each activity aim, resources and performances should be accordingly organised [1].

Reachable and measurable aims give the opportunity to make the necessary monitoring and evaluations. In this manner, A typical model that can be used in safety studies can be seen in Figure 1 [6].

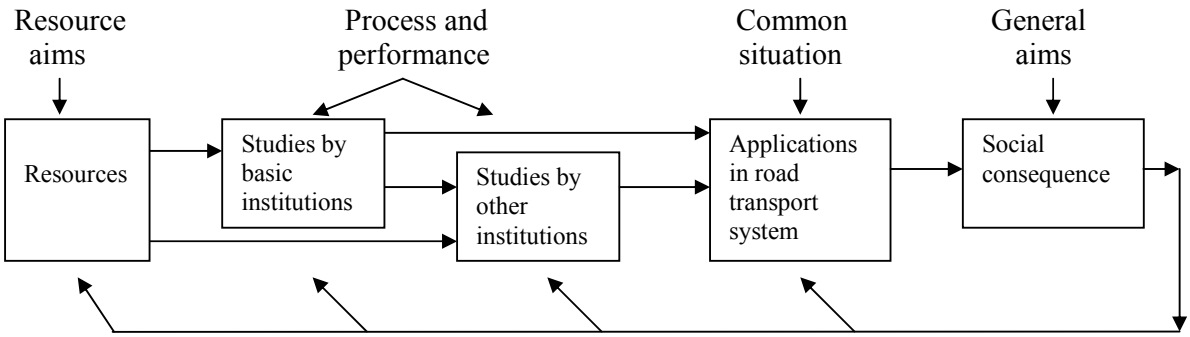

Figure 1: A typical model for safety studies

3 Situation On Traffic Safety In Turkey And Some Other Countries

The fast increase in the number of motor vehicles in the world in 1950 and after has left many countries with the problem of facing vehicle traffic's negative effects. In Turkey, especially beginning in 1970's, this increase has led to many negative results, traffic accidents being one of the primary ones. Traffic accidents cause 700,000 fatalities and 10 million injuries worldwide each year. This means a daily average of 1900 deaths and 27,000 injuries. According to a study made by the World Bank, 70% of the accidents with fatalities happen in developing countries and their cos is around 100 billion US dollars. In the last 15-20 years there has been significant decrease in the number of traffic accidents worldwide, except for the developing countries, where the problem is getting worse. The rate of increase in car ownership in most Asian countries, which is 16-18% shows that the number of vehicles in these countries will double in five years and triple in eight years. This situation is likely to cause congestion and safety problems in these countries' road network. In another study made by the World Bank, if no precautions are taken against this problem 6 million people will lose their lives and 60 million of them will be injured in 10 years time. Some countries

have taken effective measures against traffic accidents with the help of their economical power [3]. In Table 1, information is given on traffic accidents in different countries of the world.

Table 1: Information on traffic accidents

Country	Number of accidents*	Deaths per 100,000 vehicles*	Injuries per 100,000 vehicles*	Deaths per 1,000,000,000 vehicle-km**	Injuries per 1,000,000 vehicle-km**
Austria	42,126	19	1,073	14.9	0.59
Belgium	49,065	26	1,185	15.7	0.58
Finland	6,633	16	343	9.4	0.15
France	121,223	24	473	15.3	0.22
Germany	382,949	15	981	12.2	0.62
Holland	37,947	14	603	9.3	0.36
Sweden	15,770	13	478	8.3	0.23
Turkey***	65,289	41	1,213	119.8	1.27
UK	233,729	12	1,097	8.1	0.53
USA	2,116,338	19	1,481	9.6	0.48

* 1999 data
** 2000 data
*** For Turkey, since no follow-up studies about post-accident periods are made, death toll is probably around 25% higher than the figure give in Table 1 [4, 5].

Turkey could not be as successful in this manner. However, in recent years, serious studies began about the matter. It is hoped that results of these studies will be seen in the near future.

4 Traffic Safety Program For Turkey

Around 9000 individuals lose their lives in traffic accidents in Turkey each year and another 200,000 get injured. In other words, everyday 25 people die and over 500 are injured. Annual cost of accidents is estimated to be around 4,000,000 billion Turkish liras. Turkish government is conducting a "Highway Improvement and Traffic Safety Project" funded by its own resources and credits given by the World Bank. Ministry of Interior Affairs, Ministry of Education, Ministry of Public Works, Ministry of Health and Gazi University of Ankara have taken part in the preparation of the project. National Road Consultants Ltd of Sweden (Sweroad) have been acting as consultants. Within the Traffic Safety project, a sub-project under the main one, the National Traffic Safety Program was realised in order to minimise the problem.

The primary purpose of the program is to investigate the problem, establish a safety vision, and to prepare a strategy and action plan. The secondary aim is to apply the proposed measures and solve the fatality and injury problem. The proposed period for the program is between 2002 and 2011. First, a primary activities program for the first five years and a list of necessary performance indicators for the application and monitoring of the program were

prepared. The broad aim of the Traffic Safety Program is to decrease the number of deaths and injuries in traffic accidents by at least 40% in ten years' time.

The program consists of "problem", "vision", "strategy" and "plan" stages. In the "problem" stage, traffic accidents and the issue of injuries are analysed by examining the statistical data on accidents and the important elements affecting safety. In "vision" stage, general aims and long-term image is determined. Vision is also necessary for drawing the attention of the politicians, media and the public on traffic safety. In "strategy" state, general aims long-term aims are established. The necessary strategic steps in order to realise the aims effectively are also proposed. In the last stage of "plan", short and long-term are developed. In this stage also, necessary strategic steps in order to realise the aims effectively are proposed.

The expected decrease in death rates after the application of the plan is given in Table 2. The values reflect the predictions for the year 2006 as well as for the period between 2002 and 2006 [6].

If the plan is applied, more than 4200 lives will be saved in the period between 2002 and 2006.

The most effective measures seem to be to prevent aggressive type of driving and increase the use of safety equipment. It should be seen that until 2006 the most effective measures would be those that will yield solutions in the short term. More time is necessary for other measures like development of institutional actions, better highway construction and education on safety, to be effective. These kinds of measures will be more effective in the following five years.

The predicted decrease in the number of fatalities depends on the following assumptions.

- It will take a few years for the total application of many institutional/administrative measures. Thus, their benefits will not be seen before and during 2006. However, in the long term these measures will contribute to more effective traffic safety studies and help decrease the death toll.
- Some technical measures can be immediately put into effect; others need more time for application. Therefore, the decrease between 2002 and 2006 would not be linear.
- Effects of control and effects of information and campaigning were included in special issues like lowering speeds and aggressive driving and the use of safety equipment.
- When realised, it is believed that lowering speeds and aggressive driving and promoting use of safety equipment will have very obvious effects on decreasing the death toll. So, the effects of the remaining measures will be relatively reduced.
- Basic predictions depend upon international information and experience. In some cases these measures may not be valid for conditions in Turkey. Therefore, more observations and evaluations are necessary to see the effects of different measures in Turkey.

For the period between 2007 and 2011 it is believed that the number of deaths can be decreased by 1800 each year. This prediction should be renewed according to some possible revisions in the program in 2006 [6].

Table 2: Expected rate of decrease in death rates

Actions/Areas	Decrease in deaths in 2006	Decrease in deaths in 2002-2006
"Institutional/administrative" actions	+	++
"Technical" actions		
Adjusting distribution between transport modes	100	150
Safer infrastructure – interurban roads	170	360
Safer infrastructure – urban roads	90	150
Safer vehicles	75	120
Safer road users – children and youth	75	140
Safer road users – driver education and licence	25	40
Safer road users – alcohol, drugs and fatigue	70	140
Safer road users – unprotected road users	80	140
Safer road users – information and campaigning	70	140
Better traffic amendment	35	65
Better control and legal applications	70	140
Decrease of aggressive and speedy driving	480	1400
Increase use of safety equipment	430	850
Improving rescue, medical care and rehabilitation services	100	200
Better driver licensing	5	15
Safer trade vehicle traffic	70	140
New technologies	5	5
Decrease regional problems	5	15
Total	1955+	4200++
As percentage of 1999 values	20.6	

5 Costs Of Measures Proposed By Plan

The amount of money that will be spent in 2006 to implement the proposed measures is estimated to be around 130 million US dollars annually. Taking into consideration that this amount may be flexible; it should be stated that annual spending would be between 100 and 150 million USD. Additional costs for the 2002-2006 period are estimated to be between 250 and 350 million USD.

It is quite difficult to estimate the costs of the activities. Coarse predictions depend on the following assumptions.

- It is believed that "normal" traffic safety work will be conducted at a similar level to that of the pre-1999 period. It should be noted that the money to be spent for the activities of the plan is an additional cost. These additional costs should be summed up with the present annual costs in Turkey and the total costs of traffic safety works should thus be calculated.
- Costs are those belonging to state institutions. Some private costs like periodical vehicle maintenance or development of the use of safety equipment and socio-economical costs like the time cost because of low speeds are not taken into consideration in this study. Similarly, benefits like lower exhaust gas emissions or lower traffic noise because of lower speeds are not taken into consideration, either.
- Improved engineering actions will generally require new construction and new material; so, all new costs are thought to be additional costs.
- Developed control costs will include additional staff and equipment. Nevertheless, it is believed that with the present conditions of the Police and Gendarmerie organisations, many activities can be realised.

If these assumptions are taken into consideration, it is predicted that in order to save 1955 lives annually, 130 million USD should be spent every year. This amount shows us that to save one person's life an annual amount of less than 70,000 USD is necessary. All of these prove that saving a life is virtually "not expensive".

Additional costs for the 2007-2011 period will probably be between an annual 100 and 150 million USD with the first term's approach.

6 Conclusion

Some negative results of vehicle traffic, accidents being among them, impose problems for all of the countries in the world. With economical strength the problem is minimised in developed countries; but in developing countries, the problem is continuing, if not getting worse. Neither good-willed discourses nor discrete and aimless studies can be solutions to the problem. In order to prevent traffic accidents, the problem should be taken into consideration with all of its aspects and a vision should be developed. In this context, measures should be determined, reachable targets should be specified and performance to reach these targets should be evaluated.

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